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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,856	01/21/2005	Martin Hillebrand Blees	NL020715US	6174

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EXAMINER	
ZIMMERMAN, JOSHUA D	
ART UNIT	PAPER NUMBER
2854	
MAIL DATE	DELIVERY MODE
08/11/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/521,856	BLEES, MARTIN HILLEBRAND	
	Examiner	Art Unit	
	JOSHUA D. ZIMMERMAN	2854	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-7 and 10-12* is/are pending in the application.

4a) Of the above claim(s) *11 and 12* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-7 and 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/12/09 has been entered.

Claim Objections

2. Claims 2 is objected to because of the following informalities: in the newly added text "incompatible with the molecular species" in the last two lines of claim 2, it is unclear if applicant means the first or second molecular species. Based upon antecedence, it will be assumed that applicant meant to claim "incompatible with the second molecular species." Appropriate correction is required.

Claim Rejections - 35 USC § 103

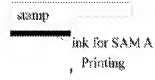
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2 and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Delamarche et al. (J. Am. Chem. Soc. 2002, 124, 3834-3835) in view of Fleming et al. (US 6503564)

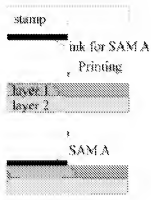
Regarding claim 1, Delamarche et al. teach "a method of applying a self-assembled monolayer of a molecular species to a surface of an article (Figure 1A), comprising:

providing on at least a portion of a stamping surface of a stamp a self-assembled monolayer-forming molecular species (see 'ink for SAM A' in reproduced section of figure 1A)



having a first functional group selected to attach to said surface, and a second functional group that is exposed when the species form a monolayer, said second group being polar (the species used by Delamarche et al. is an alkanethiol, the same as used by applicant. See second sentence of the second paragraph on page 3834),

transferring the molecular species from the stamping surface to a first portion of the article surface (see reproduced section of figure 1a below)."



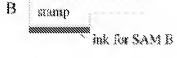
Delamarche et al. do not specifically teach "and allowing the molecular species to spread evenly from the first portion of the article surface to a second portion of the article surface, wherein the spreading is accomplished without immersion in a liquid incompatible with the molecular species." However, Delamarche et al. teach that when forming a self-assembled monolayer (SAM), the stamp is left in contact for an amount of time (first full paragraph of page 3835). One having ordinary skill in the art would recognize that the stamp is left in contact for an amount of time because the formation of SAMs is a kinetic process (that is, a process that is time-dependent), and therefore the stamp is left in contact with the article surface in order to allow the SAM to form on the article surface. One having ordinary skill in the art would also recognize that when a SAM-forming species is applied to a surface, due to surface tension effects and to gravity, the species will naturally spread on the surface (see, for example, figure 2 of Delamarche et al.). Therefore, the molecular species in the method taught by Delamarche et al. would "spread evenly from the first portion of the article surface to a second portion of the article surface." Further, Delamarche et al. further teach that, while the stamp is in contact, it is not immersed in a liquid; rather, the structures are

formed by first stamping, *then* immersing in a liquid (see Figure 3, and first full paragraph of page 3835). Therefore, the 'spreading,' as defined above, is accomplished when not immersed in a liquid.

Delamarche et al. are also silent in regards to the atmosphere of the stamping process. Since no special conditions are mentioned, a normal air atmosphere is implied. However, Fleming et al. teach a method of making a microstructured article wherein a reduced atmosphere is used in order to provide a clean environment. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the process of Delamarche et al. by placing the article "in reduced pressure atmosphere" in order to provide a clean environment to reduce contamination.

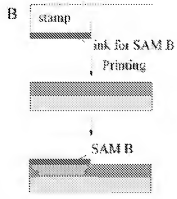
Regarding claim 2, Delamarche et al. teach "a method of applying self-assembled monolayers of two molecular species to a surface of an article (figure 1B), comprising:

providing on at least a portion of a stamping surface of a stamp a first self-assembled monolayer-forming molecular species (see 'ink for SAM B in reproduced figure below)



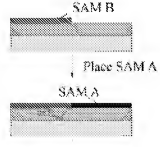
having a first functional group selected to attach to said surface, and a second functional group that is exposed when the species form a monolayer, said second group being polar (Delamarche et al. use the same species as applicant, PTMP),

transferring the molecular species from the stamping surface to a first portion of the article surface (see reproduced section of figure below),



providing ... a second self-assembled monolayer-forming molecular species having a first functional group selected to attach to said surface, and a second functional group that is exposed when the species form a monolayer, said second group being polar or non-polar (Delamarche et al. use the same species as used by applicant, ECT),

transferring the molecular species ... to said first portion of the article surface coated with a monolayer of said first molecular species (see reproduced section of Figure 1B below)."



Delamarche et al. fail to specifically teach that the second molecular species is applied via a stamping process. Delamarche et al. simply teach "plac[ing]" the second

species (see the reproduced section of Figure 1B, above). Figure 2 of Delamarche et al. shows that the second SAM (ECT) does not significantly replace the first SAM (PTMP) on the surface; therefore, one having ordinary skill in the art would recognize that applying the second SAM-forming species on top of the first SAM-forming species by forcibly using a stamp would result in the second SAM-forming species spreading over the first SAM and then adhering to the surface of the article and forming a second SAM. One having ordinary skill in the art would also recognize that applying pressure while applying the second species would speed up the coating process. Further, since the first SAM-forming species is applied via a stamp in the process of Delamarche, one having ordinary skill in the art would have been motivated to apply the second SAM-forming species to the article via a stamping process in order to effectively apply and distribute the second SAM-forming species.

Also, Delamarche et al. do not specifically teach "and allowing the second molecular species to spread evenly over the first monolayer to a second portion of the article's surface." However, Delamarche et al. teach that when forming a self-assembled monolayer (SAM), the stamp is left in contact for an amount of time (first full paragraph of page 3835). One having ordinary skill in the art would also recognize that formation of SAMs is a kinetic process (that is, a process that is time-dependent), and therefore would be motivated to leave the stamp in contact with the article surface in order to allow for distribution of the SAM-forming species and to allow for the molecules to self-assemble. One having ordinary skill in the art would also recognize that when a second SAM-forming species is applied to a first SAM, due to surface tension effects,

gravity, and the pressure applied by the stamp, the species will naturally spread on the surface (see, for example, figure 2 of Delamarche et al.). Therefore, the molecular species in the method taught by Delamarche et al. would "spread evenly over the first monolayer to a second portion of the article's surface."

Delamarche et al. further teach that, while the stamp is in contact, it is not immersed in an liquid which is incompatible with the molecular species; rather, the structures are formed by first stamping, *then* immersing in a liquid (see Figure 3, and first full paragraph of page 3835). Therefore, the 'spreading,' as defined above, is accomplished when not immersed in a liquid.

Delamarche et al. are also silent in regards to the atmosphere of the stamping process. Since no special conditions are mentioned, a normal air atmosphere is implied. However, Fleming et al. teach a method of making a microstructured article wherein a reduced atmosphere is used in order to provide a clean environment. Therefore, at the time of the invention, it would have been obvious to one having ordinary skill in the art to modify the process of Delamarche et al. by placing the article "in reduced pressure atmosphere" in order to provide a clean environment to reduce contamination.

Regarding claim 4, Delamarche et al. further teach "wherein the second functional group of the second self-assembled monolayer-forming molecular species is non-polar (Delamarche et al. use the same species as applicant, PTMP).

Regarding claim 5, Delamarche et al. are silent in regards to the atmosphere of the stamping process. Since no special conditions are mentioned, a normal air atmosphere is implied. One having ordinary skill in the art would recognize that a normal air atmosphere is used by Delamarche et al.

Regarding claim 6, Delamarche et al. further teach "wherein the article' surface is a metal surface (see figure 3 and first 4 lines of the second paragraph on page 3834) and the self-assembled monolayer-forming molecular species is selected from the group consisting of:

an omega-functionalized thiol having the general formula R'-A-R", wherein R' is --SH, A is --$(CHR)_n$-- where R is H or --CH_3, and n is an integer from 1 to 30, and R" is a polar group (see figure 1, ECT, and the first 4 lines of the second paragraph on page 3834),

a disulphide having the general formula R'"-A-S-S-A'-R", wherein R'" is a polar or a non-polar group, A and A' independently are --$(CHR)_2$n-- where R is H or --CH_3, and n is an integer from 1 to 30, and R" is a polar group, different from or the same as R'", and

a thioether having the general formula R'"-A-S-A"-R" or R'"-A-S-A'-S-A"-R", wherein R'" is a polar or a non-polar group, A, A', and A" independently are --$(CHR)_2$n-- where R is H or --CH_3, and n is an integer from 1 to 30, and R" is a polar group, being different from or the same as R'"."

Regarding claim 7, Delamarche et al. further teach "wherein the polar group R" is a functional group selected from the group consisting of --OH, --NCO, --NH_2, --COOH, --NO_2, --COH, --COCl, --PO_4^{2-}, --OSO_3^-, --SO_3^-, --$CONH_22$, --$(OCH_2CH_2)_{2n}$OH, --

$(OCH_2CH_2)_{2n}OCH_3$, $--PO_3H^-$, --CN, --SH (see figure 1, ECT, and the first 4 lines of the second paragraph on page 3834), $--CH_2I$, $--CH_2Cl$, and $--CH_2Br$, wherein n is an integer from 1 to 100."

4. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Delamarche et al. and Fleming et al. as applied to claim 1 above, further in view of Geissler et al. (*Langmuir* **2002**, 18, 2374-2377) and Xia et al. (*Angew. Chem., Int. Ed.* **1998**, 37, 550-575).

Regarding claim 10, Delamarche et al. fail to specifically disclose that their method of forming a self-assembled monolayer is used to manufacture an electronic device. However, Delamarche et al. teach that their method is used to create "a patterned layer on the surface of" various substrates, including those common to microelectronics (first 4 lines of the second paragraph of page 3834), and refers to numerous publications that teach said methods. Xia et al. (the first citation of Delamarche et al.) and Geissler et al. (the third citation of Delamarche et al.) teach using SAMs with microcontact printing to produce microelectronic devices and storage elements because it is simple, inexpensive, and flexible (see section 3, specifically the last paragraph of section 3.2 of Xia et al. and the first paragraph of Geissler et al.). Therefore, it would have been obvious to one having ordinary skill in the art to use the microstructure production method of Delamarche et al. to produce microelectronic devices, as taught by Geissler et al. and Xia et al., because it is simple, inexpensive and flexible.

Response to Arguments

5. Applicant's arguments filed 02/12/09 with respect to all the claims have been fully considered but are not persuasive.

6. Applicant's argument that Delamarche et al. do not teach the newly added limitation that the spreading be accomplished without immersion in a liquid incompatible with the molecular species is not persuasive. Clearly, as shown above in the rejections of claims 1 and 2, Delamarche et al. meet the *claimed* limitation, since it is only required that the step of spreading be accomplished without immersion in a liquid incompatible with the molecular species.

7. In response to applicant's argument that the patent to Fleming et al. is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Fleming et al. are related to making a microstructured article, and to coating a microstructured surface (abstract). Clearly, this is more than reasonably pertinent to Applicant's invention, which is coating a microstructured surface (a stamp).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSHUA D. ZIMMERMAN whose telephone number is (571)272-2749. The examiner can normally be reached on M-R 8:30A - 6:00P, Alternate Fridays 8:30A-5:00P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Joshua D Zimmerman
Examiner
Art Unit 2854

/Joshua D Zimmerman/
Examiner, Art Unit 2854